

Inwha Baek

iwbaek11@gmail.com

EDUCATION

- Harvard University** Boston, MA
Ph.D. in Biological and Biomedical Sciences May 2021
- Seoul National University** South Korea
M.S. in Biochemistry (First class honor) August 2014
- Seoul National University** South Korea
B.S. in Pharmacy (Valedictorian) February 2012
- Acquired pharmacist licensure from Ministry of Health and Welfare, South Korea

RESEARCH EXPERIENCE

- Harvard Medical School** Boston, MA
Postdoctoral Fellow 2021–Present
Ph.D. researcher; Advisor: Dr. Stephen Buratowski 2015–2021
Single molecule studies of RNA polymerase II transcription in *Saccharomyces cerevisiae*
- Adapted single-molecule fluorescence microscopy to study mechanisms of gene expression in yeast nuclear extract
 - Quantitatively examined dynamics of RNA polymerase II and transcription elongation factor Spt4/5 recruitment
 - Discovered intermediates on the pathway to activator-dependent preinitiation complex assembly
 - Spearheaded collaboration between 2 principal investigators for thesis work
 - Conducted extensive image data analysis and statistical modeling via MATLAB
- Seoul National University** South Korea
Researcher; Advisor: Dr. Se Won Suh 2014–2015
- Performed biochemical assays such as ITC and SPR to examine the protein-protein interactions
 - Simulated the protein-ligand interaction modes by molecular docking analysis
- Seoul National University** South Korea
M.S. researcher; Advisor: Dr. Byung Woo Han 2012–2014
- Determined 3D structure of SdgB, one of virulent factors in *Staphylococcus aureus* using X-ray crystallography
 - Developed DNA/protein libraries of variable lymphocyte receptors for targeted cancer immunotherapy
 - Mentored 2 research associates on cloning and protein purification

SELECTED AWARDS AND HONORS

- Van Maanen Fellowship** 2020–2021
Harvard Medical School
- Albert J. Ryan Fellow** 2018
Harvard Medical School
- Bok Center Certificate of Distinction in Teaching Award** 2018
Harvard University
- Global Fellowship** 2012–2014
National Research Foundation of Korea

TEACHING EXPERIENCE

- Harvard University** Boston, MA
Teaching assistant; Principles of Molecular Biology 2017
- Selected as teaching assistant based on academic performance
 - Led problem-solving discussion sections for group of 7 graduate students
- Seoul National University** South Korea
Head teaching assistant; Biochemistry Laboratory Course 2013
- Supervised and trained 10 teaching assistants
 - Taught and facilitated weekly laboratory sections
 - Assisted faculty in curriculum development and course material

RELATED PROFESSIONAL EXPERIENCE

Molecular Mechanistic Biology, Harvard Medical School Boston, MA
2017–2021

- Interdepartmental community studying the molecular mechanisms of health and disease
- Invited as student speaker to inaugural annual symposium
- Received Travel Award

Leder Human Biology & Translational Medicine Program, Harvard Medical School Boston, MA
2016–2021

- Integrated training program in the translation of advances in basic investigation to the prevention, diagnosis, and treatment of disease

CONFERENCE PRESENTATIONS & TALKS

I. Baek, G.A. Rosen, L.J. Friedman, Y.J. Joo, J. Gelles, S. Buratowski. Dynamic and heterogeneous pre-initiation complex assembly revealed by single molecule studies. *Mechanisms of Eukaryotic Transcription Abstracts 77*, 2019. Poster presentation delivered.

G.A. Rosen*, **I. Baek***, L.J. Friedman, Y.J. Joo, S. Buratowski, J. Gelles. Dynamics of factor exchange during transcription initiation and elongation. *Mechanisms of Eukaryotic Transcription Abstracts 64*, 2019. (*: equal contributions)

I. Baek and B.W. Han. Construction of antigen specific variable lymphocyte receptor (VLR) libraries and structure determination of a VLR from constructed libraries. *American Crystallographic Association Meeting Abstracts*, 2013. Poster presentation delivered.

“Single molecule studies of RNA polymerase II transcription initiation and elongation”. *Fragile Nucleosome Seminar Series*, 2020. Oral presentation delivered.

PUBLICATIONS

I. Baek, L.J. Friedman, J. Gelles, S. Buratowski. Single-molecule studies reveal branched pathways for activator-dependent pre-initiation complex assembly. *Molecular Cell*, 2021

G.A. Rosen*, **I. Baek***, L.J. Friedman, Y.J. Joo, S. Buratowski, J. Gelles. Dynamics of RNA polymerase II and elongation factor Spt4/5 recruitment during activator-dependent transcription. *Proceedings of the National Academy of Sciences*, 2020 (*: equal contributions)

D.G. Kim*, **I. Baek***, Y. Lee, H. Kim, J.Y. Kim, G. Bang, H.J. Yoon, S. Kim, B.W. Han, S.W. Suh, H.S. Kim. Structural basis on heavy glycosylation of serine-aspartate repeat domain by SdgB and SdgA. Under review at *Acta Crystallographica Section D*. (*: equal contributions)

J.Y. Lee, H.S. Kim, **I. Baek**, J.M. Baek, M.R. Han, S.Y. Kong, J.H. Kim, R.N. Kirchedoefler, J.O. Kim, M.D. Cooper, I.A. Wilson, H.J. Kim, B.W. Han. Overexpression, crystallization and preliminary X-ray crystallographic analysis of the variable lymphocyte receptor 2913 ectodomain fused with internalin. *Acta Crystallogr Sect F Struct Biol Cryst Commun*, 2013; 69(Pt 1):39–41.